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Carver, Martin Oswald Hugh orcid.org/0000-0002-7981-5741, Molinari, Alessandra, Aniceti, Veronica et al. (12 more authors) (2019) *Sicily in transition : new research on early medieval Sicily, 2017-2018*. Fasti On Line Documents & Research. ISSN 1828-3179

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SICILY IN TRANSITION New research on early medieval Sicily, 2017-2018

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 Ughi

Il testo che segue riguarda la nostra ricerca archeologica sulla Sicilia bizantina, islamica e normanno-sveva e in particolare riporta le ultime scoperte a Castronovo di Sicilia, che includono il riconoscimento di una chiesa del XII-XIII secolo sul Monte Kassar, la continuazione dello scavo a Casale San Pietro e una sintesi delle nuove ricognizioni nelle sue vicinanze. Quest'ultimo sito rimane il focus principale del Progetto ERC sictransit, ma in questa sede diamo anche conto dei primi risultati di un'indagine più ampia, che include una grossa quantità di reperti che provengono da tutta la Sicilia da siti scavati in precedenza (Fig. 1). Questi reperti consistono in ceramiche, metalli e vetri assieme a resti umani, animali e vegetali, che vengono analizzati nei laboratori delle università partner del progetto: York, Roma e Lecce. I principali metodi scientifici applicati sono: analisi tipologiche, petrografiche e del contenuto organico delle ceramiche da cucina e da trasporto; degli isotopi stabili e del DNA antico sui resti umani e animali per determinare la dieta e l'ascendenza genetica; infine la identificazione tassonomica e la caratterizzazione isotopica degli insiemi di resti botanici per comprendere le loro relazioni con il clima e con le diverse fasi storiche. Il progetto "Sicily in Transition" (acronym: Sictransit) combina quindi ricerche archeologiche, bioarcheologiche e biomolecolari in un unico progetto integrato. Gli obiettivi attesi sono stati suddivisi, per comodità e chiarezza, in tre principali aree di studio, vale a dire: agricoltura (e cibo), scambi e demografia. Infine concludiamo con una valutazione della ricerca svolta sul campo e delle prospettive di indagine dei tre laboratori.

Introduction

This article reports archaeological research on early Medieval Sicily (acronym: *sictransit*), carried out in 2017-2018 by the Universities of York, Rome and Lecce under the auspices of the European Union 2020 programme².

The principal activity on the ground has been the archaeological investigation at Castronovo of Sicily with which our account begins. This comprises excavations and survey at three sites in the neighbourhood of the town, at Monte Kassar, Colle di San Vitale and Casale San Pietro.

The project 'Sicily in Transition' also includes a programme of bioarchaeological and biomolecular archaeological research using material from twenty previously excavated sites (Fig. 1). Preliminary results from this work are offered in the second half of the article³.

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² This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (SICTRANSIT - grant agreement No 693600).

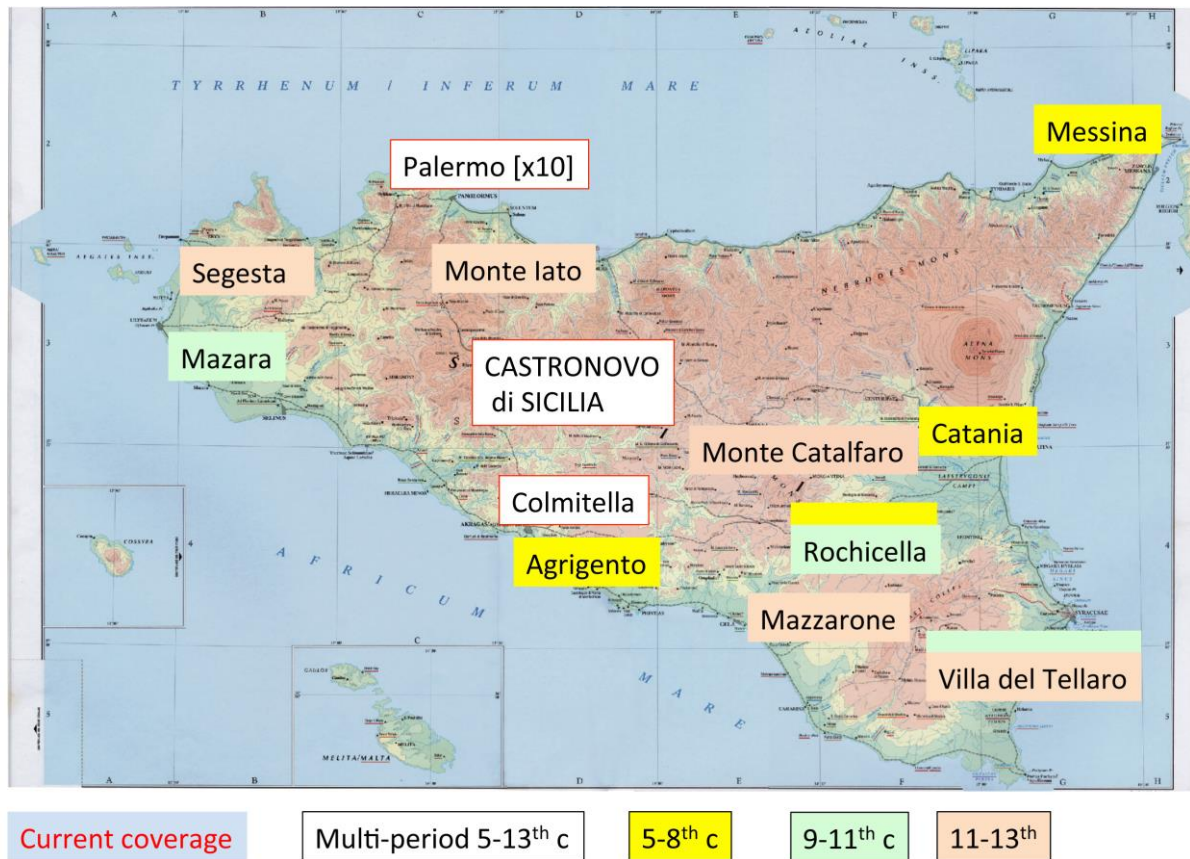


Fig. 1. Sources for the Sictransit project, 2018, with sites for sampling colour-coded by period.

Investigations at Castronovo di Sicilia

The attraction of Castronovo is that it has a cluster of sites that between them span the period of interest of Sictransit as a whole (5th to 13th century) (Fig. 2). In 2017-2018 the focus was on the investigation of the site of a church on **Monte Kassar** and the long stratified sequence at **Casale San Pietro**. In the plain of the River Platani where the Casale San Pietro is situated there was a sequence of settlements spread over several hectares. These are being mapped by surface collection and geophysical survey. We begin with a summary of Survey in Castronovo and its hinterland reporting progress to date.

Survey at Castronovo and its hinterland. Findings up to Aug 2018
Madeleine Hummler

The area of Castronovo was the subject of antiquarian investigation in the 19th and 20th century, remains being noted on Monte Kassar, Colle San Vitale and at Casale San Pietro on the Platani plain.⁴ Intensive surveys and trial excavations were carried out on surviving structures on Monte Kassar in 1997 and 2005⁵. In 2013, Angelo Castrorao Barba recorded diagnostic sherds of pottery over an extensive area of the Tor-

³ This project has been reported through the good offices of FASTI from its inception. The first report (for 2015-2016) was published as CARVER, MOLINARI 2016; and the second (for 2016-2017) published as CARVER et al 2018; the present paper, the third interim report, covers the period August 2017 to August 2018. For a list of our interventions at Castronovo see TABLE 4 at the end of the text.

⁴ TIRITO 1873, MARGAGLIOTTA 1989.

⁵ MAURICI 2000, CANZONIERI, VASSALLO 2007, VASSALLO et al 2015.



Fig. 2. Sites under investigation at Castronovo di Sicilia.

Torto/Platani watershed, including the territory of Castronovo, with a particular focus on the Roman and Byzantine periods⁶. Roman, Byzantine and Medieval settlement patterns in the valleys of the Torto and further south in the lower Platani valley have also been reviewed and summarised in the last 15 years⁷.

From 2014, at the invitation of Stefano Vassallo (Soprintendenza Archeologica di Palermo), Castronovo di Sicilia and its district were adopted as a research area by a partnership between the Universities of York and Rome Tor Vergata, and in 2016 it became the central focus of the project “Sicily in Transition” (*Sictransit*) newly funded by ERC. Preliminary surveys were launched on Monte Kassar and the plain of Casale San Pietro (from 2014) and (from 2016) the area of the Colle San Vitale citadel and the present upper town of Castronovo⁸. Summarised here are descriptions of archaeological investigations on Monte Kassar and in the plain of San Pietro up to August 2018.

Survey on Monte Kassar (MK)

Preliminary survey on the Kassar included geophysical mapping in areas adjacent to the walls of the Byzantine fortification, the church and the spring of St Calogero (2014, MK Int. 1, 2, 3, 7⁹) (Fig. 3). In general, resistivity was unresponsive, but the fluxgate gradiometer surveys gave positive results at Monte Kassar Int 2, where features were predicted north of the north wall of the ‘chiesetta’ (see MK Int. 11, below). On excavation these roughly coincided with rectangular walled areas revealed by excavation. Promising anomalies were also

⁶ CASTRORAO BARBA *et al.* 2014, CASTRORAO BARBA 2015, 2016.

⁷ RIZZO 2004, 2005, 2010; PARELLO, RIZZO 2014; CANZIONERI, VASSALLO 2007.

⁸ Canzonieri, Giannini in CARVER *et al.* 2018. Survey, building recording and excavation have been carried out at the medieval citadel of Colle San Vitale by the Soprintendenza (CANZIONERI, VASSALLO 2007) and by the Sictransit team. An integrated interim report is in preparation. The geophysical surveys were conducted by Helen Goodchild (University of York) between 26 August and 14 September 2014. The summary presented here is based on her archive report (Goodchild 2018).

⁹ Int. is an abbreviation for archaeological intervention. For a list of those carried out to date see Table 4.

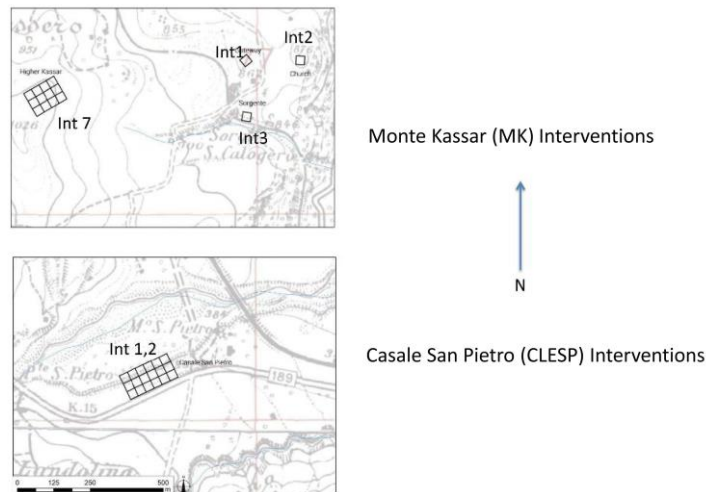
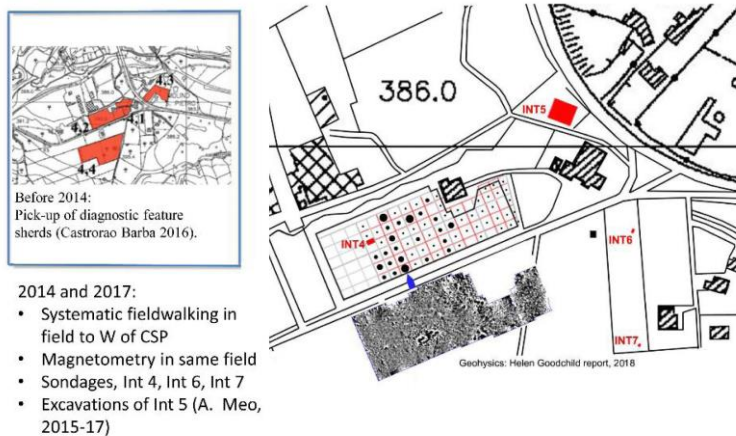


Fig. 3. Location of geophysical Surveys at Castronovo di Sicilia in 2014. Location of surface collection and geophysical surveys on Monte Kassar (above) and Casale San Pietro (below) (Hummler). Above.

Fig. 4. Geophysical and surface collection surveys at Casale San Pietro, with (inset) location of pre-2014 find-spots by Castrorao Barba (2016). (Hummler). Below.



located by magnetometry on the high part of Monte Kassar (Int. 7) but, on testing by excavation, proved to be reflections of the natural bedrock¹⁰. Productive excavation on the Kassar has defined the structure of the east gate (Int. 5), occupation against the defences (Int. 6), and a fortified house (the 'casermetta') overlooking the defences (Int. 9)¹¹.

Survey at Casale San Pietro (CLESP)

The flat area bordering the river Platani that stretches either side of Casale San Pietro has long been linked to an extensive early settlement associated with rockcut tombs at Capillo Venere and a defensive site and cemetery at Ministalla¹². A previous reconnaissance survey by Angelo Castrorao Barba had drawn attention to the

survival of pottery of many periods on the surface in the fields and olive groves on the plain that borders the river¹³.

The *Sictransit* project set out to apply intensive remote mapping to the whole of this area, beginning in 2014 with a magnetometer and surface survey carried out in a field immediately west of Casale San Pietro (CLESP Int. 1, 2) (Fig. 3)¹⁴. Trial excavations to the west and south of the actual Casale San Pietro made contact with an extensive Byzantine settlement, much reduced by deep ploughing, but revealing two children's stone-lined tombs to the west (Int. 4) and the foundations of mortared stone walls to the south (Int. 6). Trial excavation to the north of Casale San Pietro located a well-preserved stratified sequence between the 3rd and 13th centuries AD, the excavation of which is ongoing (Int. 5, see Meo, below) (Fig. 4).

A large positive (highly magnetic) anomaly was located towards the centre of the field, with two smaller patches of high magnetism to the east of this patch, with similar characteristics (Fig. 5). The area also featured a series of linear trends, forming a rectilinear pattern across the western half of the field. Dipolar responses reflect the modern fencing, as well as the concrete platform of the building that obstructed the north-eastern part of the field¹⁵.

¹⁰ The anomalies picked up by geophysical survey on the upper part of Monte Kassar near the defensive wall (Int 7) consisted of oblong patterns appearing to indicate long buildings, such as barracks or granaries. These were tested with three test pits in 2017 (Int 10, F. Giovannini) and determined as due to an outcrop of rock, perhaps cut by quarrying. There were no indicative finds. See Giovannini 2017 in archive.

¹¹ See CARVER *et al.* 2018

¹² GIUSTOLISI 1999: 57-8.

¹³ Information kindly provided by Angelo Castrorao Barba in 2014, see CASTRORAO BARBA 2016.

¹⁴ By Helen Goodchild, September 2014.

¹⁵ Archive report by Helen Goodchild 2018.

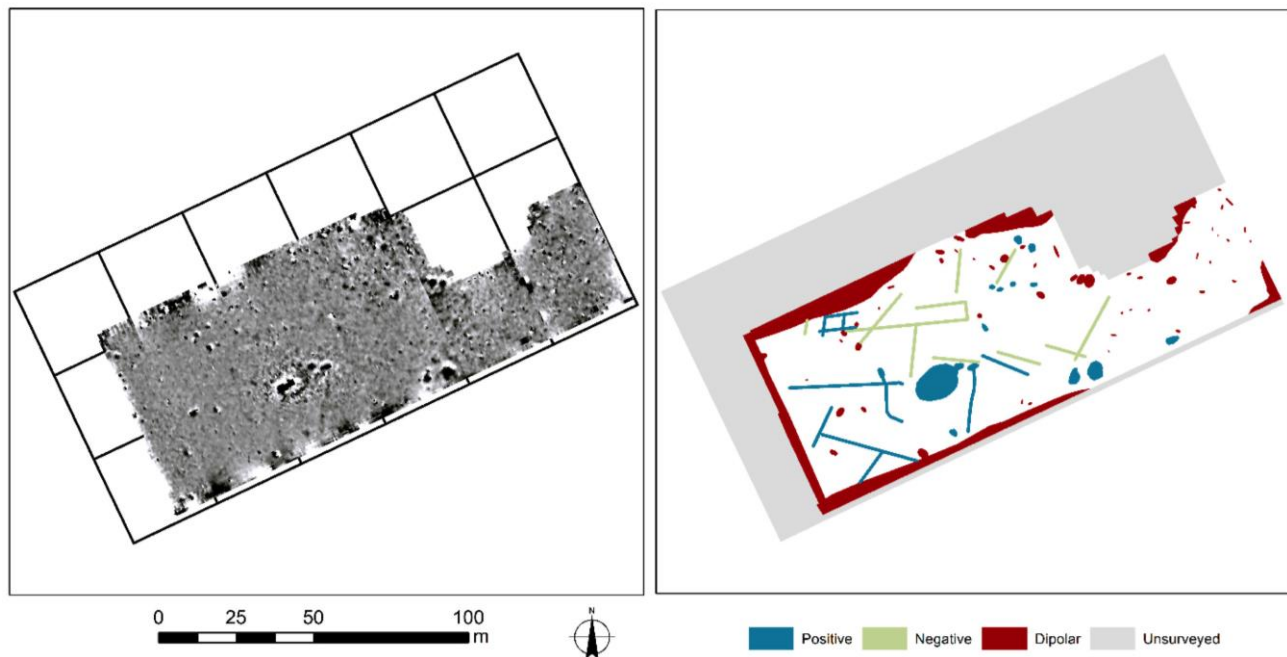


Fig. 5. Magnetometer survey and interpretation of CLESP Int. 1 by Helen Goodchild (2014). The positive signals imply pits, ditches or highly magnetic burnt deposits. The negative signals imply walls (ie archaeologically positive features).

Systematic surface collection in the same area (2014, Int. 2) gave a strong signal of occupation in the western part of the survey area and included ceramics dating to the Archaic, Roman, Late Roman, early Byzantine, Islamic Norman, Swabian and medieval periods¹⁶ (Fig. 6). It is currently uncertain whether this reflects one or several continuing centre(s) of settlement or is a consequence of the site formation process. The top of the Byzantine children's graves contacted in Int. 4 (c. 0.30–0.40 m below the field's current surface), the height of the present San Pietro church floor (c. 1.40 m above the surface of the road that flanks the Casale to the north) and the slope of the natural gravel subsoil towards the river in Int. 5 (dropping from a depth of c. 1.7m below the current ground level in the SE of Int. 5 to c. 2.15 m in the NE of Int. 5), all indicate that Casale San Pietro was perched on a rise of ground which slopes away to east, west and north. However some spatial patterning and chronological separation was already evident in this first exercise (Fig. 7).

To date, surveys and previous researches in the Castronovo district have proved valuable in locating potential concentrations and stratified sequences of occupation. The sequences excavated are enabling a more secure dating of the ceramics, which will in turn lead to more precise spatial distribution of settlement nodes by date. Between Casale San Pietro and Monte Kassar, the narrative now extends from the 3rd century to the 13th century, the period covered by the *Sictransit* project, but it is likely to extend further into the medieval and post-medieval periods at Colle San Vitale.

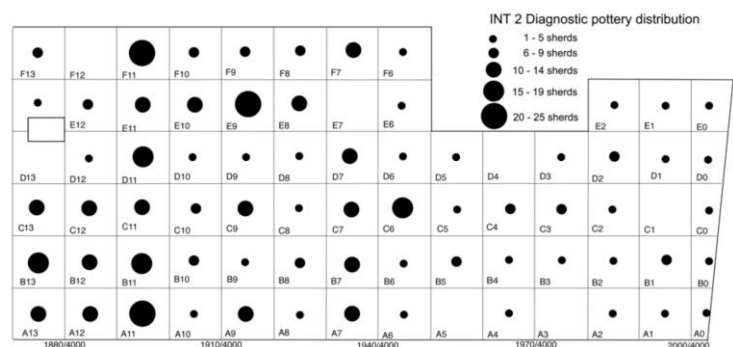


Fig. 6. Overall results of surface collection, (CLESP Int. 2) showing focus on the west side, where 76 squares, measuring 10 x 10m were surveyed, and c. 1600 sherds collected, of which c. 30% have been identified. The Casale lies on the east side of this field. (Hummler).

¹⁶ Research by C. Mangiaracini and M. Carver in archive.

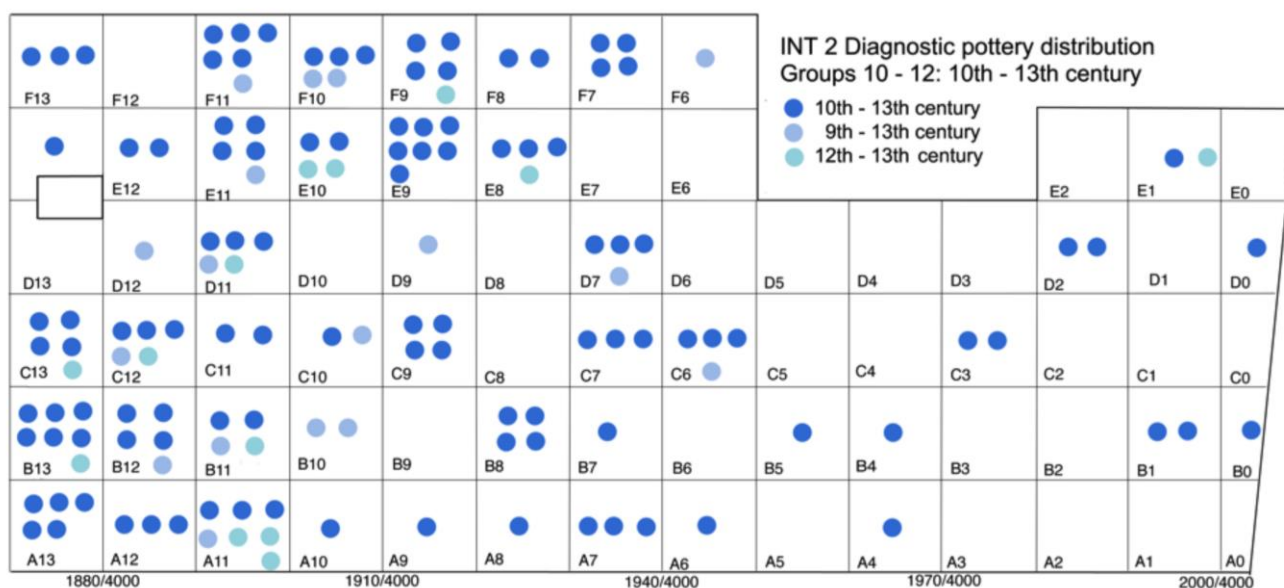


Fig. 7. An example of the pottery distribution in Int. 2 by period, in this case 10-13th century (Hummler).

The **next phase of survey** in the Castronovo hinterland is designed to discover the use of space in each major period. To that end, the continuing programme will involve: (1) delving further into the nature of occupation within the 90 hectares defined inside Monte Kassar's fortifications, using survey by drone to complete the plan of the fortress, and geophysics and surface collection to locate possible concentrations of activity; (2) researching the extent, structure and function of the large rural settlement adjacent to Casale San Pietro, by extending the geophysical and systematic fieldwalking survey; (3) mapping historically-recorded buildings, tracks, field boundaries, terraces and agricultural activities in the area using documents and maps, a project being undertaken by Andrea Salvatore Galizia, Nicoletta Giannini, Alessandra Molinari and Emanuele Canzonieri.

On completion, the results of the Castronovo district survey will be compared with those already undertaken by others elsewhere in Sicily, notably in the hinterland of Entella, Segesta and Piazza Armerina/Sofiana, in order to reveal historical trends in settlement and landscape¹⁷.

Excavations on Monte Kassar: the Medieval Church on the eastern promontory (MK Int. 11, 2017)
Paola Orecchioni and Fabio Giovannini

Description

The site investigated was that of a suspected church, previously termed the 'chiesetta', on the eastern promontory of Monte Kassar where the ruins of two rectangular structures had been noted in the 19th century¹⁸. In 2005, the site was cleared and examined by a team from the Soprintendenza of Palermo directed by Stefano Vassallo. This operation revealed the wall-lines of an apsidal building with a tile floor, interpreted on the basis of a similarity in build with the 'casermetta', the defensive walls and its towers, as an early Christian church contemporary with the Byzantine fortress. However, the area examined produced only material of medieval date, leading to the deduction that the building had been reoccupied in the late Middle Ages, probably for agricultural use¹⁹.

¹⁷ CORRETTI *et al.* 2014, MOLINARI, NERI 2004, VACCARO 2013.

¹⁸ TIRRITO 1873: 46.

¹⁹ VASSALLO *et al.* 2015: 102-110; Fig 132, Fig 138. For other previous work on the Kassar see VASSALLO 2009, 2010; VILLA 1997.

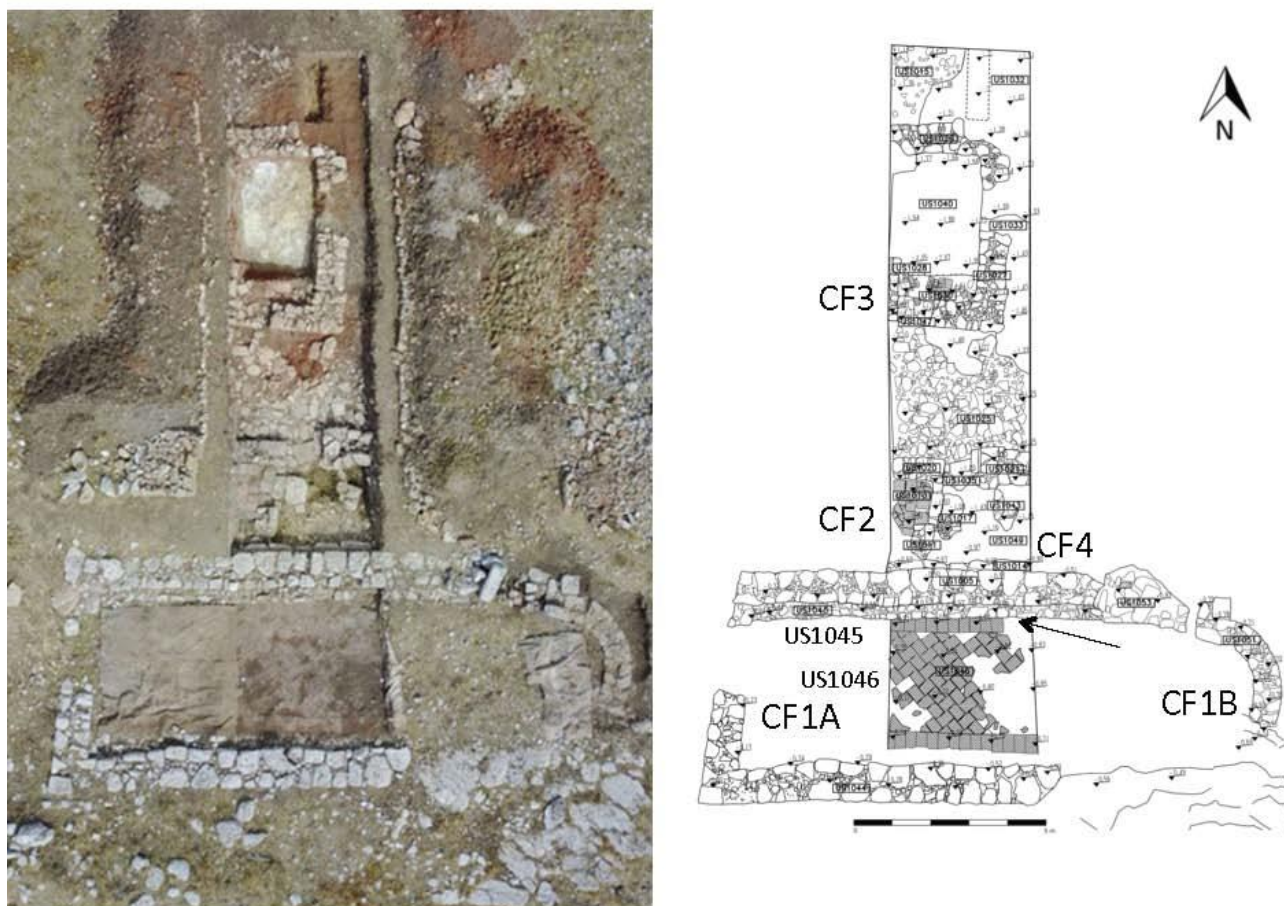


Fig. 8. Monte Kassar, Int. 11. Excavations inside and to north of the church in 2017: overhead drone photo (left) and plan. The arrow marks the point at which the under-floor sequence was investigated (see text) (Orecchioni and Ciccone).

At the start of the current project in 2014, a geophysical survey by Helen Goodchild showed a group of anomalies to the north of the extant church building (MK Int. 2). A long dark anomaly showed alongside the north wall of the church, and a rectilinear anomaly (approximately 3 x 2m) extended northwards from this. Other anomalies showed north of the church²⁰. These anomalies (termed positive) would normally be attributed to ditches or pits or fired material. In this case, since the anomalies coincide with the excavated walls they would seem to indicate extensive burning. At the north end details were obscured by the strong dipolar effect due to the steel fencing along the fortress wall.

The investigations that followed in 2017 were aimed at understanding the church building, its development and its context, and testing for the possible existence of an adjacent cemetery. The area of the church was cleaned and an area 15x5m opened north of the extant north wall of the church. Within the church walls an additional 3x5m was opened, exposing the tiled floor of the church and allowing a limited area adjacent to the church wall to be examined. Overall excavation and preliminary analysis have defined the nature of the natural strata, the extent of the church (CF1) and a series of structures to the north of it (CF2, 3, 4²¹; Fig. 8).

The natural geology is composed of limestone bedrock, covered by a layer of powdered limestone, capped by a thick layer of oxidised red clay. The site had been levelled for the constructions that followed. The church (CF1) consisted of two structural elements: a rectangular west end (CF1A) and a segment of apse to

²⁰ Report by Helen Goodchild in archive 2018. Note that these are 'positive anomalies' which equate to negative features (pits) or ditches.

²¹ The abbreviations used for stratigraphic units are: US – Unità Stratigrafica (context). CF – Corpo di fabbrica (element of structure).

the east (CF1B). The northern wall of the western part was 1.10-1.13m wide made with large roughly-squared blocks with inserted chips of brick, bonded with clay containing flecks of limestone. It was set on a splayed foundation of large blocks that jutted out on its north side. Running along the interior of the north wall was a narrow wall made of smaller stones bonded with white mortar (US 1045). A similar wall had run along the interior of the south wall, and between the two was a floor made of square tiles (US1046, 20x30cm) edged with a strip of larger tiles (30x50cm).

The remnant of the apse was an arc of wall 0.75-77m wide. The apse and the two internal walls were aligned and were reported as having the same mode of construction consisting of irregular courses of rough-cut stones bonded with a tough white mortar. These internal walls, and the floor between them, appeared to be additions to the walls and foundation of the western structure. This relationship was examined by the removal of a small portion (0.6x0.6m) of the internal wall and the tile floor in the NE corner (arrowed on plan, Fig 8), which indicated that both were secondary to the north wall and its foundation. Stratified in the layer beneath both the internal wall and the floor was a sherd of green-glazed pottery datable to the mid 12th or 13th century. This meant that the internal walls and the floor, and by similarity of construction, the apse (CF1B), were added to a pre-existing west end (CF1A) at a date no earlier than the late 12th or early 13th century. The resulting building now measured 15.3x6.3 m internally.

Outbuildings to the north

To the north of the church was the stub of a corridor that followed the exterior of the north wall, ending in a threshold denoting a doorway at its east end (CF2). Its walls were built with roughly-shaped stones bonded with clay containing flecks of limestone and the structure had the same kind of terracotta tile floor as the one inside the church. CF3 was a building further north with a doorway in its east wall, the part of the building exposed in the excavation measuring 5.4x3.6m. Between CF2 and 3 was an area of hard standing composed of reused slabs and tiles entered at the east end of CF2 via a threshold (CF4). Local movement that may be of seismic origin had resulted in the upheaval of the clay and had probably destabilised the buildings, which subsequently collapsed, leaving heaps of rubble.

The pottery assemblage associated with these structures consisted of 346 sherds with a date-range predominately from the mid 12th to the later 13th century. Fragments of a glass beaker and a hanging lamp were also identified, belonging to the late 12th or 13th c. The datable coins were a follis of William II (1166-1189) struck at Messina with an Arabic inscription on the reverse, and a denarius of Charles of Anjou (1266-1282). Coins of the 13th century were also recovered during the 2005 investigations, together with a devotional pendant inscribed *ecce ancilla domini* [behold the handmaid of the lord] and *ave [Maria] gratia plena* [Hail Mary full of grace].

Interpretation

Following the investigations in 2005, the building re-examined here was seen as a 6th-7th century Byzantine Church built to a single design, with an apse, nave, tile floor and interior walls. No recognised Byzantine material was found, but this is not untypical of the Monte Kassari fortress as a whole, which nevertheless sustains a date between the 7th and 9th century. The medieval material was explained as deriving from the later adaptation of the building to an agricultural use²². However, in the 2017 excavations, the discovery of a sherd of green-glazed pottery stratified beneath the tile floor and the internal wall implied that these structures were installed after the late 12th-13th century, although possibly reusing an earlier structure represented by the rectangular west end. The find of a glass hanging lamp and a devotional pendant with an invocation to the Virgin Mary imply that the resulting structure functioned as a church in its medieval phase, rather than as an agricultural building.

The structures to the north (CF2, 3, 4) were contemporary with this final building. CF2 featured a floor of similar design at a similar level and appears to belong to a corridor running along the exterior that may have

²² VASSALLO *et al.* 2015 as above.

Fig. 9. Casale San Pietro, Int. 5. The final stages of excavation in 2017. Monte Kassar is on the horizon, centre.

Fig. 10. Casale San Pietro, Int. 5. Plan of the sequence Roman to Norman (3rd to 13th century) as at October 2017 (Meo).

had aided the circulation of worshippers for some ritual purpose, such as visiting a relic. CF3 may have been a store or a cell, but its size and function was not determined. The 2017 excavations thus suggested that the church and its out-buildings belong to an ecclesiastical establishment founded *ex novo* in the 13th century at the highest point of the eastern promontory, perhaps served by a modest community.



Excavations at Casale San Pietro (CLESP Int.5 2017) Antonino Meo and Madeleine Hummler

The excavation north of the Casale San Pietro in Int 5 continued in 2017, now extended to an area measuring 15x16m²³ (Fig. 9 and 10). The following is a summary of the new discoveries based on the full report held in archive, in which the stratigraphic sequence was organised into 8 Periods, 22 Phases and 64 Ac-

²³ For excavations in 2015 and 2016 see CARVER *et al.* 2016 and 2018. The summary given here is based on the full report in archive by Meo and Hummler 2017. We are grateful to Francesca Colangeli (PhD, University of Rome Tor Vergata) for the preliminary data on the coins.

tivities. The walls, contexts and assemblages were ordered by their stratified relationships and largely dated at this stage by ceramics and coins²⁴. While the current sequence is secure in outline and has great promise, it should be regarded as provisional until the completion of the excavation in 2019.

The excavations allowed us to identify a long stratigraphic sequence which spans a period, with a few *lacunae*, from the first traces of human occupation, located above the subsoil and dated to the late Roman imperial period (2nd–3rd century AD), to the dumping of material connected with the construction of the adjacent main road in the mid-20th century.

The sequence and events that have been defined raise many important questions of cultural and social affiliation for the history of the site and, in comparative terms, for the history of the Island.

Period I

The surface of natural deposits of river gravel and clay was contacted at c1.7m below the present ground surface at the SE corner of the excavation and at c2.15m at the NE corner, implying that the natural terrain slopes down south to north towards the River Platani²⁵.

Period II (Late 2nd/3rd)

Occupation of the site probably started in the late imperial Roman period: we can provisionally assign the construction and destruction of a settlement consisting of a single long building identified in the eastern part of the excavation area to the Late 2nd/3rd. The deposits of this period are represented by rammed earth floors and rubble that probably indicates drainage. Among the materials pertaining to the period, we note the presence of coins of Antoninus Pius (AD138-161), African Red Slip Ware²⁶ and African amphorae²⁷.

Period III (5th - 6th /7th century)

The next period is represented by the construction of a large building on a different alignment (Fig. 10 in yellow). Its walls were c.70cm wide, constructed of limestone blocks set in horizontal courses bonded with white mortar (CF2), and extended for more than 16 metres. At a given moment this late Roman building was extended to the east by an annex some 5m wide (CF3).

All the pottery retrieved so far has come from secondary deposits. It includes sherds of 5th century date²⁸ and items dating to the 6th–7th, like an African Red Slip lamp²⁹ and two signet-rings, dated 4–7th century³⁰. There were no clear indications about the use of the spaces enclosed by this building. However its dimensions suggest that it functioned perhaps as a *statio* or the *pars rustica* of a villa.

Period IV (9th - 11th century)

Between the 9th and the 10th century, the area was occupied by a new group of buildings that made use, in part, of the pre-existing structures. The large spaces characteristic of the earlier periods gave way to a series of smaller buildings probably used as dwellings. Excavation revealed a partly-paved courtyard in the east, a possible street or road in the north, and a room perhaps used as a kitchen in the centre (CF4). The function of the room can be deduced from the presence of a fireplace near an opening in the east wall. The opening was maybe biforal, as implied by the presence of some fragments of a small column found among the collapsed stones of CF4 (Figs. 11, 12).

²⁴ Each component of a wall, like each deposit, has a US number; thus US1147, 1159, 1165, 1182, 1218, 1228 were all identified as parts of CF4.

²⁵ A pedological study at Casale San Pietro and Monte Kassar was undertaken by Cruz Ferro Vaquez in 2017, summarised and documented in the SicTransit online archive (restricted access) at datafiles/scientific analysis/bioarchaeology/soil science/reports/Hummler 20 Feb 2018.

²⁶ BONIFAY 2004: *Sigillée* type 3; 8a.

²⁷ BONIFAY 2004: type 22 = *Africana* IIa.

²⁸ BONIFAY 2004: *Sigillée* type 39 = Hayes 61C; *Culinaire* type 10 = Hayes 197.

²⁹ BONIFAY 2004: lamp type 69 = *Atlante* X tardif.

³⁰ see Colangeli, in CARVER *et al.* 2018, Fig. 22.



Fig. 11. Casale San Pietro, Int 5. Successive walls of Roman (CF1), Byzantine (CF3), Islamic (CF4, 6) and Norman (CF13) date viewed from the east. The location of the Islamic-period tabouna lies between the end of CF1 and the ranging pole. (Meo).

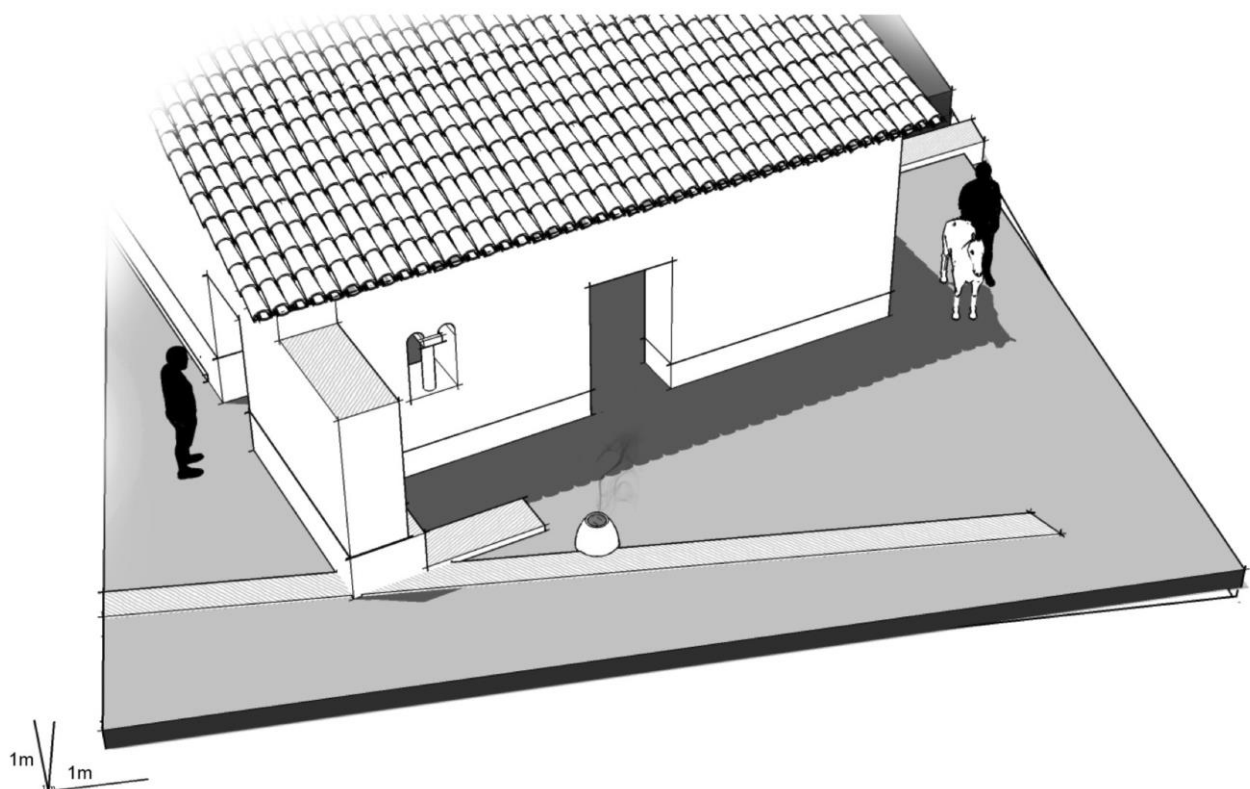


Fig. 12. Casale San Pietro, Int 5. A reconstruction of CF4 (10-11th century) (Meo).

After the erection of the house an external courtyard was created in front of the building's eastern door. The part closest to the exit was protected by a rudimentary pavement consisting of large flagstones laid flat. In the southern zone, part of the levelled Roman wall was used for paving. In front of the northern door a regular pavement was set, made of large limestone flagstones set side by side. Given the precise nature of this evidence, which differs markedly from the paving of the eastern courtyard, it is not impossible that this activity refers to the remains of a street or road paving. In the courtyard we identified a ring of burnt clay associated with the levelling off of wall CF1, which is interpreted as belonging to a small bread oven (*tabouna*)³¹. Following the construction of CF4, the development of the settlement continued with buildings CF6, CF7, CF8, implying additional or modified structures.

Probably between the late 10th-early 11th century, the structures belonging to this settlement appear to have been systematically dismantled and abandoned. The discarded masonry that came from the plundering and the potential collapse of the walls of the complex covered the tread surfaces, causing the uneven level of the ground in all excavated sectors to rise, reaching a maximum depth of 30-50cm in the area of the courtyard. The high percentage of ceramics and animal bones present in these deposits may perhaps be related to the formation of a refuse dump above this rubble. Among the materials, in addition to glass phials and "glass coins", we noted the presence of slow-thrown and turned cooking pots, glazed and unglazed table ware (cups, dishes, bowls, lamps), amphoras, filter jugs and limestone trays.

Period V (11th century)

After an interval, the area was reoccupied by a new edifice (CF9), which in part reused the eastern room of the first Islamic-period building. It is likely that the building located in the northern part of the area (CF2) remained standing; this accounts for the limited nature of its transformation, although this situation may perhaps not apply over the whole settlement. The new building (CF9) partly occupies the footprint of the western room of the old Islamic-period building (CF4) and continues its relationship with the courtyard, onto which its only door opens. Unfortunately, later destructive episodes have prevented us from clearly defining elements of this structure, except for a few wall-remains preserved over only one or two courses at the most.

Period VI (Late 11th-12th century)

Sometime in the late 11th-12th century the pre-existing buildings were demolished and the ground level was raised followed by the construction of CF13 (Fig. 10 in blue). Two walls (north and south) of this building were defined, built *a sacco* using medium-sized unfinished blocks laid in approximately horizontal courses, with clay-soil bonding and infilling. In the 12th century, a new structure that might have functioned as a store was added to the house. This structure, which was very poorly preserved, was identified only in part. The fragment of the wall, oriented N-S, consisted of a single course and, slightly further north, of an alignment attached to the main building.

To facilitate circulation in the area, which still featured the collapse of the preceding occupation, some levelling layers were laid down around the buildings. The use of these layers as an ancient tread surface is attested by the presence of finds at their interface, especially horseshoe nails. The chronology is based on the presence of Norman coins and new types of pottery, like glazed cooking pot and green-glazed pottery with grooved decoration. In the late twelfth century, Norman buildings were dismantled and abandoned. The absence of large dumps of rubble makes it likely that the architectural remains were systematically plundered.

Period VII (Late 12th -14th century)

The settlement was destroyed between the late 12th-13th century, and then covered by soil that was probably intended to convert the site to agricultural use. The only traces of later occupation in the medieval period consist of a putative tree-pit identified in the western part of the excavation, that has yielded finds datable to the 14th century, including maiolica arcaica from north Italy and Spanish lustreware.

³¹ For Tunisian parallels, see: MILANESE, GELICHI 2000: 165.

Period VIII (second half 20th century)

Finally, the construction of the main modern road (Strada Statale 189), located a few metres to the north of the excavation area, entailed a series of transformations in its vicinity. The area was (potentially) levelled flat, causing the loss of the late medieval, early modern and recent deposits. After this a deposit of quite clean brown clay was dumped on the site, effectively protecting the archaeological strata from further damage.

Assessment

The sequence at Casale San Pietro was strengthened in 2017, in area, time span and the range of activities. Further understanding demands the expansion of the area to the maximum extent possible to map the buildings and throw light on their function, and high precision dating to measure not only their erection and collapse but the length of intervals between peaks in activity. This will be addressed by a combination of pottery seriation to determine primary contexts and the radiocarbon dating of samples of the animal bone they contain. Bayesian statistical analysis will then be applied to improve the precision of these dates using the stratigraphy as the prior information.

Sicily in Transition: Summary reports from the First Plenary Seminar (York, July 2018)

Thirty members of the sictransit team assembled at York for the first of three annual seminars planned to submit the research programme to holistic review and exchange interim results. Progress reports were presented on the scientific studies of pottery, human bone, animal bone and plants from the 20 Sicilian sites (including Castronovo) that form part of the project's agenda. It was there decided that the objectives of the project should be concentrated on three major areas of study: agriculture (and food), trade and demography, and the researchers have reported under these headings.

Agriculture and food

Environmental studies

Girolamo Fiorentino and Milena Primavera

Analytical work relating to *Sictransit* has been incorporated into the research programmes being carried out at the Laboratory of Archaeobotany and Palaeoecology, Department of Cultural Heritage, University of Salento (at Lecce) led by Professor Girolamo Fiorentino. The team includes Girolamo Fiorentino (director), Milena Primavera (deputy director), Angela Stellati, Matilda Stella, Ignazio Minervini, Marianna Porta, and Anna Maria Grasso.

The programme is currently identifying plants sampled at 17 Sicilian sites (TABLE 1) and researching the development of procedures designed to improve the precise identification of taxa from carbonised/mineralised samples and align their occurrence with potential environmental changes and past agriculture practices.

TABLE 1: *Samples of plant remains on Lecce's agenda*

<i>District</i>	<i>Roman</i>	<i>Medieval</i>
Agrigento	Burgio Favara Agrigento QER	Burgio Colmitella Favara Sciacca Castello Agrigento QER
Catania	Rocchicella	Rocchicella*
Enna	Piazza Armerina Sofiana	Piazza Armerina Sofiana
Messina	Taormina	

Trapani		Monte Polizzo Mokarta Segesta Mazara del Vallo
Palermo		Brucato, Sciara Monte Kassar Casale San Pietro Palermo al-Khalisa* Palermo Maredolce* Entella*
Siracusa	Akrai (6th cBC- 6th c AD)	

[*samples not yet acquired]

Preliminary indications

A reconstruction of the environment between the 2nd and 7th century at Insula I in **Agrigento** found that the surrounding landscape was characterized by olive trees and vineyards in the 2-3rd century. During the 6-7th century the vegetation cover shows the presence of oaks and Mediterranean shrubs. At the Roman temple, garbage accumulating after the 4th c indicated the cultivation of cereals, pulses and tree fruits (peach, almond, apricot, plum, olive and grape). At **Akrai** (in the east) there was a big change between the early and later Roman periods: by the 4-6th century, fruit trees, cereals and flax are strongly represented. At **Colmitella** the cultivation of cereals was noted, together with use of the faba major bean in the 8-9th century (probably broad bean, *Vicia faba* var. *major*). At **CastroNovo, Monte Kassar and Casale San Pietro**, olive occurred in the Roman and Byzantine periods, pistacio appears in the Islamic period and different species of plums (*Prunus* spp.) in the Islamic and Norman periods. At **Mazara del Vallo**, citrus fruits were found in 10th century contexts (Silo 2), watermelon, aubergine and cotton were encountered in 11-12th century contexts (Silo 18), and durum wheat and spinach in the 13th century (Silo 4). These taxa were all listed by Watson (1983) as possible imports that arrived during the Arab regime.

Ongoing **methodological research** at Lecce includes the identification of plant macroremains by morphometric analysis (geometrically defined shapes) and the distinction of remains belonging to different varieties of legumes and species of the *prunus* genera (plums, cherries, peaches, nectarines, apricots, almonds) using the anatomical signature surviving in burnt wood from the fruit trees. Following the identification of the large variety of the *Vicia faba* bean at Lecce (12th c) and now at Colmitella (8/9th c) the hunt has intensified for the origin of this pulse and its first appearance in southern Europe. An important procedure is comparing the stable isotope signatures of ancient plants with their modern counterparts in order to identify possible irrigation practices in agriculture introduced by Arabs or changes in rainfall connected to climatic forces.

Animal Husbandry

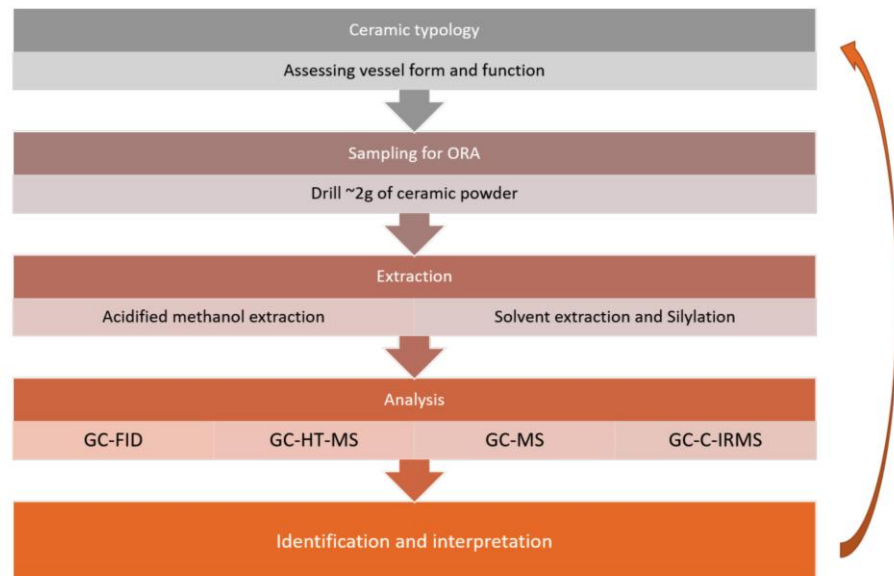
Veronica Aniceti

Animal bone assemblages have now been identified to taxa from 7 sicilian sites: at Mazara del Vallo, Casale San Pietro, Colmitella, Rocchicella and 3 sites in Palermo City (Sant'Antonino, Corso dei Mille and Palazzo Normanni (Norman Palace). The preliminary results were presented at the 7th Postgraduate Zooarchaeology Forum at Palermo organised by the writer with Matteo Bormetti and Mauro Rizzetto on 27-28 June 2018³².

For the Byzantine period (5-8th century) the rural sites at **Rocchicella** and **Colmitella** show an even presence of cattle, sheep and pig. Sites of the Arab period show a varied reaction to the consumption of pork, as between town and country: at urban sites in Palermo (**Sant'Antonino** and **Corso dei Mille**) sheep are well represented, while pig is virtually absent, and the pattern is repeated at **Mazara Del Vallo**. Pig is however pre-

³² <https://www.pzaf.org/>. Publication forthcoming in BAR.

Fig. 13. Organic residue analysis: trajectory of analysis, with methods employed (Drieu, Lundy).



sent in the same period at **Colmitella** (AG)³³. In the Norman period, pig and sheep appear together in urban sites at the **Norman Palace** in Palermo and at **Mazara del Vallo**. Biometrical analysis on sheep post-cranial bones indicates an increase in size of this species between the Byzantine and Arab periods in rural **Colmitella** and between the

Arab and Norman periods in urban **Palermo**. The complete data-base is currently being analysed in detail in preparation for its submission as part of a PhD dissertation which will be embargoed until 2022.

What was in the cooking pots? Understanding resource use, diet and the transport of comestibles through organic residue analysis of ceramic vessels

An introduction to the methods

Léa Drieu and Jasmine Lundy

In addition to archaeobotanical and archaeozoological study, *Sictransit* is investing in the detection of the remains of plants, animals and fish in cooking pots and transport containers, using **organic residue analysis (ORA)**. The aim of this research is to contact and identify comestibles that were supplied, transported and consumed, and so throw further light on the agriculture and food available to successive generations over the period of study. The commodities identified in cooking pots and other domestic containers (Jasmine Lundy) and amphorae (Léa Drieu) will provide information about how cuisine (Jasmine Lundy) and trade in food (Léa Drieu) varied in Sicily by region, space and socio-cultural affiliation. High through-put extraction and analytical methods are being applied to a range of pottery from different Sicilian sites in order to isolate and identify organic residues absorbed in the porous ceramic matrix, thence to identify specific resources that may have been contained and processed in the pottery vessel.

Organic products, such as animal adipose fats, dairy products, plant oils, fish oils or wine are complex mixtures of several molecular compounds. During the use of the pottery, those compounds are absorbed into the porous pottery walls. Depending on their chemical properties, they are more or less preserved in this porous matrix, depending on their chemical properties, and in particular depending on their solubility in water. For organic residue analysis (ORA), potsherds are drilled into a powder and the molecular compounds are extracted with appropriate solvents. Gas-Chromatography (GC) is then used to separate the various molecular compounds constituting the complex mixture that has been extracted. Each molecule is then identified through Mass Spectrometry (MS), directly after eluting from the GC column. The analytical process is summarised in Fig. 13.

ORA relies on the 'biomarker' concept: natural products are identified through the detection of molecular compounds (or distribution of molecular compounds) that are both specific to the product and stable enough to

³³ And at Castronovo, Casale San Pietro, see FASTI 2016.

be preserved over centuries³⁴. The molecular composition of many organic products, such as beeswax and conifer exudates (resin, pitch and tar) is well known and very specific. Animal adipose fats, dairy products, and plant oils can be differentiated when their molecular distribution is well preserved, essentially through their distribution of triacylglycerols (TAGs). However, in most archaeological samples, the TAG distribution has been altered by degradation (micro-organism activity, oxidation, hydrolysis) over time. To further understand the origin of degraded animal products, Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry (GC-C-IRMS) techniques are used to determine the compound specific ¹³C values of the most ubiquitous molecules identified in archaeological residues: palmitic (C_{16:0}) and stearic (C_{18:0}) acids³⁵.

Although ORA has proven very efficient in studying the content of prehistoric pottery, the context of Medieval Sicily presents several challenges. Firstly, no biomarkers or distribution of biomarkers have yet been identified for several important plant products that were potentially contained and transformed in pottery between the 6th and the 13th century (for example leek, spinach, citrus, aubergine, fava beans). Secondly, there is still little consensus concerning the detection of wine in archaeological pottery. Thirdly, plant oils can be distinguished from animal fats when not too degraded, but there is still no means of discriminating between various sources of plant oil (olive, sesame, nut, pistachio oils for example). Lastly, the identification of animal fats through carbon stable isotope analysis is complicated because no reliable references exist for animals raised in Mediterranean environments (TABLE 2). This picture is further complicated by the potentially frequent mixing or re-use of both cooking pots and amphorae.

Organic product	Biomarker or biomarker distribution	Analytical protocol to extract and detect biomarkers	Isotopic references
Dairy products	Yes, if not degraded	Yes	Yes, for Northern Europe
Ruminant adipose fats	Yes, if not degraded	Yes	Yes, for Northern Europe
Non-ruminant adipose fats	Yes, if not degraded	Yes	Yes, for Northern Europe
Marine fish (garum)	Yes	Yes	Yes, for Northern Europe
Freshwater fish	Yes	Yes	Yes, for Northern Europe
Plant oils	Partial, if not degraded No distinction between taxa (except castor and <i>Brassicaceae</i> oil)	Yes	Scarce
Leafy vegetables	Only for <i>Brassicaceae</i>	Yes	Scarce
Wine	No consensus	No consensus	No
Conifer exudates	Yes	Yes	-
Cereals	Yes	To develop	Yes, for distinguishing C ₃ plants (wheat, barley, etc.) from C ₄ plants (millet)
Fava beans	No	No	No
Citrus	No	Yes	No

TABLE 2: Current challenges in identifying organic products potentially contained in medieval pottery by ORA.

These challenges are being confronted in our laboratories through innovative analytical approaches. In addition, we are conducting simulation experiments designed to reveal the decay products of different taxa. We

³⁴ EVERSHERD, 2008.

³⁵ COPLEY *et al.*, 2005; CRAIG *et al.* 2011; DUDD AND EVERSHERD, 1998; EVERSHERD 2008.

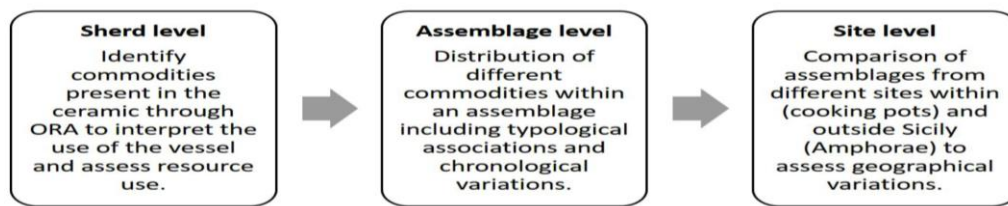


Fig. 14. Organic residue analysis: trajectory of interpretation (Drieu, Lundy).

have gathered various commodities currently grown in Sicily: meat, fish, dairy products, wine, olive oil, leafy vegetables and cereals in order to identify biomarkers of these products and to measure their isotopic values. We have also carried out experiments that involve cooking and storing these commodities in experimental pots to understand the absorption mechanisms that occur during mixing, cooking and storing processes. Finally, fragments of these experimental pots have been buried to determine the kind of decay product likely to result from burial in selected micro-environments.

Based on the results of these studies, we hope to discover any equivalences between the type of pot and its associated food, the likely repertoire represented by archaeological assemblages and the likely traffic in co-mestibles that was practised (Fig. 14). This last will be of particular importance for the elucidation of trade networks in which Sicily was a player between the 5th and 12th centuries (see Drieu, below).

Cuisine in transition

Jasmine Lundy

The aim this ORA project is to examine the temporal variation of detectable foodstuffs residual in cooking pots. The strategy adopted is to focus on well-documented multi-period sites (Castronovo CLESP, Mazara del Vallo (MZ) and Palermo (PB, CSP, GA), which cover a temporal range of 9-13th century. These sites also present a range of contrasting contexts: a well-stratified rural site (Casale San Pietro at Castronovo), the first town to be occupied by the incoming Arabs in the 9th century (Mazara) and the city of Palermo, the effective centre of government and most prosperous place in Sicily, 9-13th c. In addition, sites with otherwise rare assemblages are included (Rocchicella (RCL), 9th century; Monte Iato (MI), 12-13th century). The outcome anticipated is a new understanding of the range of foodstuffs, their association with types of pottery, settlements and communities and the social and economic implications of these variations. The findings of these inquiries also draw on the evolving typology of pottery vessels (see Meo, below) and relate closely to the results of stable isotope analysis for the determination of diet (see Ughi, below).

A total of 153 ceramic samples have so far been analysed for organic residues. These samples represent 153 separate vessels from 5 sites across Sicily (24 from CSP, 35 from PB, 76 from CLESP, 10 from RCL and 8 from MI). These assemblages contain a variety of cooking pots and other domestic vessels ranging in date from the 9th century AD to 12th century AD. Of the samples so far extracted for residue analysis using acidified methanol extraction techniques, 85% of the extracts yielded lipid concentrations above 5µg/g, which is deemed the minimum lipid concentration that can be reliably identified to origin and interpreted³⁶. This demonstrates good preservation and has enabled further investigation of these extracts to identify biomarkers and begin interpretation of the use of the vessels.

In-depth analysis and interpretation have begun on these extracts. Gas Chromatography techniques applied to the extracts have enabled the identification of a number of products - animal fats, plant waxes and oils and resins. Plant waxes were evident in a number of cooking pots from all of the sites analysed. That said, the presence of these biomarkers were most abundant in samples from Casale San Pietro, where biomarkers specific to Brassica vegetable origin were also identified in a number of samples. Two samples from Casale San Pietro show the presence of plant oils, which is provisionally suggested as olive oil, but will require confirmation

³⁶ EVERSHERD 2008.

through further investigation. Evidence of conifer resin was present in 9 of the samples from Palermo (5 from Castello San Pietro and 4 from Palazzo Bonagia). The detection of resin was based on the presence of diterpenoids and oxidation by-products (abietic, dehydroabietic and 7-oxo-dehydroabietic acids). It is likely this resin was being used as a sealant to waterproof the cooking vessels. The presence of retene and methyldehydroabietic acid in one of the samples, could suggest the boiling of pine to make pitch, in agreement with previous studies³⁷. Interestingly, resins have not yet been observed in cooking pots from the other sites investigated in this study.

A large majority of the samples analysed showed evidence of degraded animal fats. Assessing the different distributions of TAGs and their associated fatty acid components can provide some differentiation between ruminant and non-ruminant animal origin and ruminant dairy and adipose fats³⁸. However, these classifications are often limited and can be complicated by degradation and the mixing of commodities. To further understand the origin of these lipids Gas GC-C-IRMS will be used to better distinguish between adipose and dairy products, and ruminant and non-ruminant resources.

So far at least two samples from Casale San Pietro indicate the use of dairy products in these vessels. The majority of these samples suggest the processing of adipose fats, from both ruminant and non-ruminant sources. Comparisons of isotope data obtained from all the assemblages so far studied are ongoing, and at present there seems to be some differences between the types of animal fats present in ceramics from Palermo and Casale San Pietro. Further investigation and analysis of reference samples will enable a more robust and detailed interpretation of these results.

Trade

Pottery use in Sicily, 5th -12th century

Antonino Meo

Since 2016 research on the pottery of medieval Sicily, dated between 5th-12th century, has focused on assemblages from three main sites: Monte Kassar and Casale San Pietro in the Castronovo area (PA), and Mazara del Vallo (TP).

The first of these is an 8/9th century Byzantine fortified site, where two buildings with military associations have been investigated: a house abutting the defensive walls³⁹ and a central building (casermetta)⁴⁰. On the Kassar, the basic assemblage consisted of simple types of cooking pot and some globular amphorae.

Casale San Pietro is a large lowland village, inhabited between 2/3th-13th century (see Meo *above*). Between the 9th and the 10th century, the meagre assemblage consisted of hand-made/slow-thrown cooking pots with inturned rims, together with amphorae that were perhaps imported from eastern Sicily. By contrast, between the 10th and the 11th century the village seems to have become totally dependent on Palermo: amphorae, all the tableware and most of the kitchen ware were imported from the Palermo Medina (Fig. 15)⁴¹. This mutual relationship may have been owed to trade initiatives or the tax system, something that further research on the ceramics may well elucidate. During the 12th century, the system of production and the trade networks changed, and new types of pottery were produced by means of previously unknown technologies⁴². Among these are green-glazed pottery with grooved decoration, produced in many centres of the Island, and partially-glazed cooking pots, probably produced in the north-eastern part of Sicily. Examples of these were found at Casale San Pietro (Fig. 16).

The third area of ceramic study, Mazara del Vallo, is a city on the western coast of the Island, that came under increased development from the Islamic and Norman periods. Here excavation in the Xitta quarter of the old town in 1997 produced a sequence of rich assemblages including ceramics, animal bones and plants⁴³ (Fig. 17). The very rich pottery assemblage from Mazara, beginning in the late 7th-early 8th century, testified the con-

³⁷ BUONINCONTRI *et al.*, 2017; PECCI AND GRASSI 2016.

³⁸ DUDD AND EVERSHED, 1998; MOTTRAM *et al.* 1999.

³⁹ CARVER *et al.* 2016, Fig. 5.

⁴⁰ CARVER *et al.* 2018, Fig. 4.

⁴¹ For the Palermo assemblages, see: ARDIZZONE *et al.* 2015 and bibliography.

⁴² MOLINARI 2012.

⁴³ MOLINARI, CASSAI 2010; and see Fiorentino (*above*) for the plants.

tinuous link between the harbour and the North Africa and maybe, the Aegean sea. In the 10th to 11th century Mazara city was not dependent on Palermo but produced its own medium-high quality table- and kitchenware (both glazed and unglazed) (Fig. 18). Thanks to its coastal position it also received imports from Palermo and elsewhere. In Mazara, glazed table ware from al-Andalus and Aegean amphoras are attested for the first time. Between the second half of the 11th and the 12th century we can again notice new transformations linked to strong political, economic and social changes.

In the future, we aim to combine these data with other sources of information, not only to show the changing commodities being traded and their networks, but the changing sociology of dining as reflected in table wares and the size of cooking pots. This will entail the integration of the archaeological data with archaeometric studies (C. Capelli, Università di Genova) and organic residue analysis on amphorae and cooking pots (see above).



Fig. 15. Casale San Pietro. Pottery from the 10th-11th century levels (Meo).

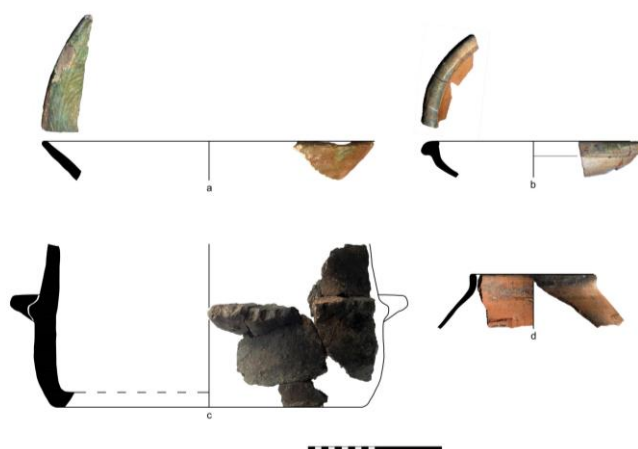


Fig. 16. Casale San Pietro. Pottery from the 12th century levels. (Meo).



Fig. 17. Mazara del Vallo old town, showing the line of the medieval walls and the location of the excavations in the Xitta district (Meo).



Fig. 18. Mazara del Vallo. Glazed bowl from Palermo (10th-11th century) (Meo).

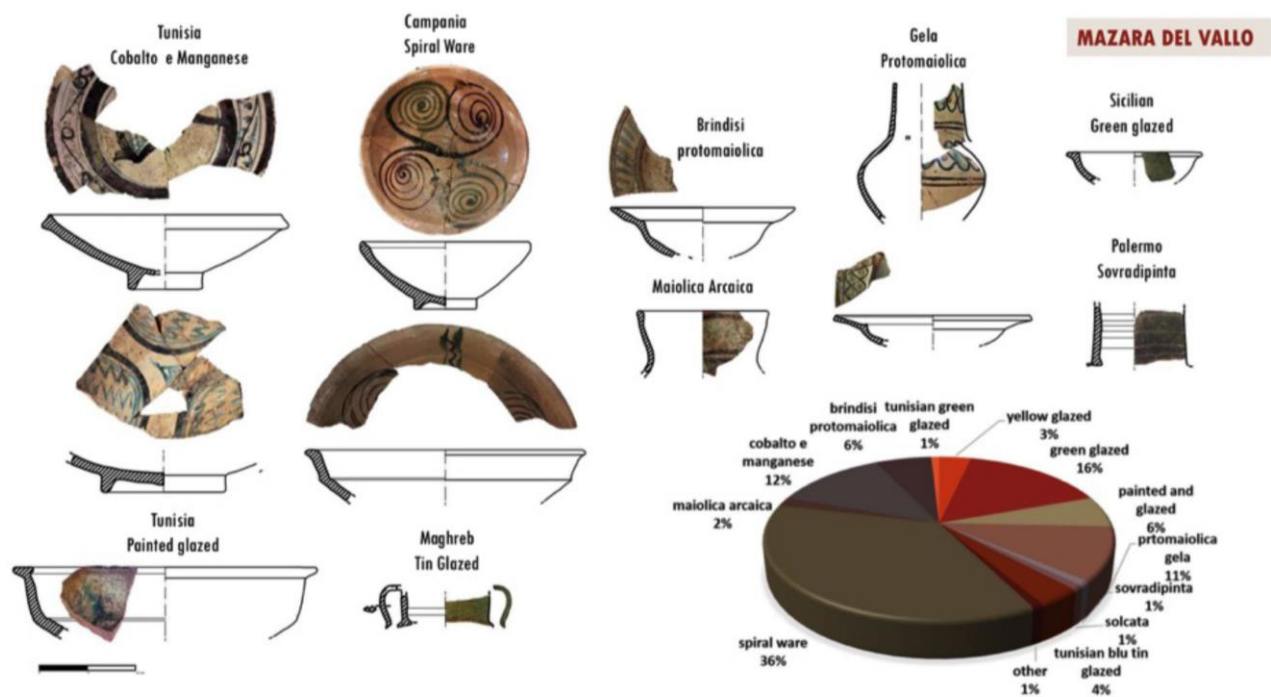


Fig. 19. Mazara del Vallo. Decorated fine wares of the late 12th -14th century imported from North Africa and the Italian mainland (Orecchioni).

Pottery use in Sicily, 13th-14th centuries

Paola Orecchioni

Our research on late medieval Sicilian pottery at this moment includes ceramic assemblages from two sites, namely the *chiesetta* at the Kassari (MK Int. 11, above) and Via T. Gaspare Romano at Mazara del Vallo (TP)⁴⁴, dated from the late 12th to the 14th century. The work is still in progress, but it is nonetheless possible to make some general and very preliminary reflections on the nature of these assemblages⁴⁵.

It has been possible to note a clear difference between the two contexts, but this is not surprising considering that we are comparing a small rural sanctuary where probably very few people lived and the rubbish pits of a big city like Mazara. In these pits there was a large variety of forms of vessels for cooking, storage and table ware, together with a huge quantity of imported wares (62% of the fine decorated wares assemblage) originating in Tunisia, Spain, Campania, Puglia, Tuscan and Liguria (Fig. 19). In Castronovo the pottery was naturally more modest, and the percentage of imports lower (22% of the fine decorated ensemble), and basically limited to some imports from south Italy (Puglia and Campania), while the larger portion of fine decorated ware were supplied by Palermo.

The continuation of this research on all sites, in conjunction with the application of petrographic analysis, will allow us to detect places of manufacture, model the networks of supply and refine the chrono-typological sequence of the pottery.

⁴⁴ MOLINARI, CASSAI 2006.

⁴⁵ The preliminary results have been recently presented at the AIECM3 congress held in Athens (Meo A., Orecchioni P., *Pottery assemblages from Mazara Del Vallo (TP) and Castronovo di Sicilia (PA) from the 9th to the 14th century*, in Xlle Congrès AIECM sur la Céramique Médiévale et Moderne en Méditerranée (Athens, 21 - 27 novembre 2108), forthcoming.

Amphorae distribution between the 8th and 12th century

Paola Orecchioni and Claudio Capelli

The movement of amphorae, as is well known, can be tracked from their point of origin using petrographic (thin section) analysis of the fabric. In particular, provenance data are obtained by locating geological deposits similar to those composing the sandy inclusions in the fabric on the Mediterranean geological maps. More precision is obtained using an integrated archaeometric and archaeological approach combining archaeological (typology, distribution) data and the comparative thin section analysis of reference pottery samples of known origin, where available.

New analyses made by the *Sictransit* project are being integrated with a data-base of thin sections already in existence at the University of Genova (DISTAV) and the preliminary results have been recently presented at the international seminar on “*Early-medieval and medieval transport containers. Production centres, contents, networks of exchange*” held in Rome⁴⁶. The focus is on the medieval period and the 8th to the 12th century in particular. Ninety-six samples from sixteen different sites have been analysed by means of the polarizing microscope, including samples from Sicily, Sardinia, the Italian mainland, Provence and Tunisia (Fig. 20).

The investigation aims at identifying homogeneous groups of fabrics that can be correlated with specific production areas or centres and at comparing the movement of amphorae, as indicated by their fabric, with the nature of their contents as determined by biomolecular analysis (see Drieu below). The results of this analysis for the amphorae originating in Palermo sampled in a number of sites (in Provence, Tunisia, Sardinia, Pisa and Naples) have endorsed the central role played by Palermo in the Mediterranean trade during the 10th and 11th centuries.



Fig. 20. Map showing sites sampled for determining the provenience of amphorae from their fabric (Orecchioni).

⁴⁶ Capelli C., Orecchioni P., *Considerazioni di sintesi sulle analisi petrografiche di contenitori anforici di VIII-XII secolo*, in Atti del convegno in memoria di Fabiola Ardizzone, *I contenitori da trasporto altomedievali e medievali (VIII-XII secolo). Centri produttori, contenuti, reti di scambio* (Roma, 16-18 novembre 2017), in press. The proceedings also include papers on SICTRANSIT research by Alessandra Molinari, Antonino Meo, Lea Drieu, Oliver Craig, and Martin Carver (forthcoming).

Exploring the changes in traded products in the Mediterranean between the 6th and the 13th centuries

Léa Drieu

The challenge of determining the contents carried in amphorae by means of biomarkers surviving in the pottery fabric has had a long history of empirical experiment, while still leaving some procedures unvalidated and important equivalences unverified, mainly those concerning plant products such as wine and plant oils (Drieu et al., forthcoming). A major part of the present project is therefore being dedicated to methodological research in order to discover more reliable procedures and seek greater precision in the identification of taxa. The development of extraction protocols and detection techniques are ongoing at York in BioArCh and in the Department of Chemistry (in a collaboration with Prof. Jane Thomas-Oates).

Eighty-three samples of amphorae are currently under examination from Sicilian sites, distributed across periods 550-750 (6 samples), 750-900 (8), 900-1050 (15), and 1050-1250 (4), together with samples of exported Sicilian amphorae that arrived elsewhere in 750-900 (6), 900-1050 (34) 1050-1250 (10). Preliminary observations on GC/MS data are that undetermined fats dominate all the periods, probably due to significant degradation processes. Plant oils seem to be of more importance in Byzantine times, but these preliminary results must be confirmed by enlarging the sampling. Containers make use of conifer products through all periods, with an important diversity of products during the Byzantine period (resin, pitch and tar), though these practices are far from systematic. The standard wine biomarkers are generally scarce. Up to this point, the results suggest either that amphorae were not mainly used for wine transport or that the method we used is not able to efficiently detect degraded wine biomarkers; but experimental work continues (see above).

Glass and metal finds

Francesca Colangeli

The analysis of glass and metal finds began with the study of two urban sites and a rural site in central-western Sicily. The material comes from excavations carried out at Via Tenente Gaspare Romano (Mazara del Vallo), at Bonagia Palace (Palermo), and from the 2014-2017 excavation campaigns at Castronovo di Sicilia reported here⁴⁷.

The contexts have different chronologies and developments: at a preliminary analysis the materials coming from the wells or pits of Via Tenente Gaspare Romano seem chronologically attributable to 3 different periods: the 8th, 10-11th and 13th century⁴⁸. The materials from Bonagia Palace seem to be attributable to a narrower chronological horizon of the second half of the 10th - first half of 11th century⁴⁹. From Castronovo di Sicilia, the material excavated on Mount Kassar, within the Byzantine fortress belongs to contexts of the 7-9th century while the stratified sequence at Casale San Pietro ranges from the 9-13th century⁵⁰.

The majority of the *metals* studied during this first year of research did not provide very relevant information. They are mostly iron objects in an extremely fragmented and oxidized state, a condition that, in most cases, makes it very difficult or even impossible to identify the objects. Most of those recognized are nails and artefacts relating to carpentry. However, the excavations at Casale San Pietro and Via Tenente Gaspare Romano have produced identifiable tools that can be linked to various work and production activities. In the layers of the abandonment of the Islamic village and in the construction phases of the Norman Age of Casale San Pietro, there are two sickles, two chisels (one with a narrow blade and one with a wide blade) and a probable drill bit⁵¹. While the sickles are clearly related to agricultural activities, the latter three objects would be related to stone-working activities. Another two objects come from the wells with the early-medieval materials of Via Tenente Gaspare Romano. The identification is still uncertain but they would seem to be two harpoons; tools

⁴⁷ I want to thank Professor Molinari, and the Soprintendenza ai BB. CC. AA di Palermo, especially Dott. Stefano Vassallo and Dott.ssa Carla Aleo Nero for making the material available for study.

⁴⁸ Pottery study is in progress. For preliminary information, see Orecchioni and Meo here.

⁴⁹ T.

he dates of the contexts examined were elaborated by Viva Sacco in her PhD study of the pottery from Bonagia Palace and the church of Santa Maria degli Angeli. For a summary of the chronologies of the contexts examined (SACCO 2017).

⁵⁰ Also in this case the pottery study is in progress. For preliminary information see contributions here by Orecchioni and Meo.

⁵¹ For the drill bit NAVARRO PALAZÓN, ROBLES FERNÁNDEZ 1996: 70, fig. 41.



Fig. 21. Glass from Monte Kassar and Mazara del Vallo. – nn.1-3, Goblets from Monte Kassar, 8th century context. (Cfr. Isings 111 type); nn.4-6 - Little flasks from Via Tenente Gaspare Romano (Mazara del Vallo) in a context of the second half of the 10th century (Cf. Tisseyre 1997 p.71 fig.1 e p.74, tav. A n.1-9 e 14; Foy 2012, pp.105-106, fig.8, n.30 type D); n.7 – Beaker with arch and arcade cut decoration, from Palazzo Bonagia (Palermo) in a context of second half of 10th – beginning of 11th century. cfr. (Similar to Bass et al. 2009, p.44, fig.4-3, BK1); nn.8-9 – Pruned beakers from Via Tenente Gaspare Romano (Mazara del Vallo) 13th century context. Cf. Foy 2014, p.146, f.21, A1 e B1 (Colangeli).

clearly linked to fishing⁵². Among the copper alloy objects there are two seal rings and a buckle found respectively in the area of Casale San Pietro and Monte Kassar and chronologically attributable respectively to the 6-7th century and advanced 7-early 8th century⁵³.

Even if at this early stage, the *glass finds* seem to provide the most interesting data relating to the change of tableware during the different political regimes and for comparison between coeval sites (Fig. 21). The 8th century contexts of Monte Kassar and Via Tenente Gaspare Romano show a predominance of goblets generally attributable to Isings type 111⁵⁴. Regarding Islamic-period chronologies, between the second half of the 10th and first half of the 11th century Mazara del Vallo and Palermo

seem to share the same types of glass objects; most are small flasks with a very recessed cone base⁵⁵. From the Bonagia Palace, there are more prestigious products⁵⁶. Even if the precise location of the area of the fatimid Ḥālīṣa or Ḥārat al-ḡadīda is still uncertain, its proximity to the church of Santa Maria degli Angeli (also known as Gancia) and the similarity of the material contexts of the two sites allows for the hypothesis that the two areas were inhabited by the same social class⁵⁷.

Finally, in the 13th century contexts pruned beakers seem to be omnipresent, as happens in most of the late-medieval contexts already known, not only in Sicily but also in the rest of Italy and in some countries of the Mediterranean basin and of continental Europe⁵⁸. Pruned beakers mainly refer to two types: with a low and wide cylindrical body and slightly turned-out, or with a taller and narrower cylindrical body, a very extruded edge and a stapled foot⁵⁹.

In this first phase of analysis there appear to be two gaps in the distribution of vitreous tableware. The lack of vitreous material in 9th century contexts is a phenomenon already known in many areas of the Italian penin-

⁵² For an example see STERN *et al.* 2015: 134, fig. 2 (a-b), fig. 3.

⁵³ For the rings see CARVER *et al.* 2017: 15. For the buckle BALDINI LIPPOLIS 1999: tipo 2.VIII.4, 228, nn. 17-18.

⁵⁴ ISINGS 1957: 139, forma 111.

⁵⁵ The typology is already known in Palermo from the contexts of the excavation of the warehouses of the Regional Archaeological Museum "A. Salinas" (TISSEYRE 1997: 71 fig. 1 e p. 74, tav. A n.1-9 e 14). Moreover, the objects seem comparable with a type present in the contexts of second half of the 10th in Šabra al-Manšūriyya. FOY 2012: 105-106, fig. 8, n. 30 (type D).

⁵⁶ These are mostly glasses decorated with abrasion of the surfaces. As an example, BASS *et al.* 2009: 44, fig. 4-3, BK17.

⁵⁷ On this see SACCO 2017: 339 with bibliography.

⁵⁸ For examples from other Italian and European contexts, see SEDLÁČKOVÁ *et al.* 2014; FIORELLA 2012; STIAFFINI 2012; RICCI 2002; WENZEL 1977.

⁵⁹ Foy 2014:146, f. 21, A1 e B1.

sula and is probably due to the reorganization of glass production and to the capillary recycling of glass scraps⁶⁰. To this it must be added that the knowledge of the material culture of the Island in the 9th century is still partial⁶¹.

At the moment, objects attributable to the 12th century seem to be missing. However, in the current state of research it is not possible to state with certainty whether this absence is due exclusively to the history of the individual contexts analyzed⁶² or whether it is a common data, and possibly what are the causes that may have produced this new hiatus. The research of next year in some new sites in Palermo and in Piazza Armerina will try to answer these and other questions by expanding the data to our knowledge with the intent also to understand, in a comparative perspective, any similarities or differences between western and eastern contexts, while also comparing different kinds of settlement (urban and rural) with each other.

Demography

Samples have now been obtained from sixteen Sicilian cemeteries, seven of Byzantine date and Christian rite, and for the subsequent period comprising the Islamic, Norman and Swabian periods there are nine cemeteries that exhibit the Muslim burial rite, either alone or in adjacent Islamic and Christian burial grounds. The individuals encountered (n=172) are currently undergoing tests for their analytical viability. Current indications are that the population to be examined will contain viable samples from at least 13 cemeteries, 60 individuals in four cemeteries of the Christian rite from the Byzantine period, 5-8th century (Agrigento, San Miceli, Contrada Sant'Agata and Catania Sant'Agata la Vetere), 14 individuals in three cemeteries of the Muslim rite from the Islamic period, 9-11th century (Palermo Castello San Pietro, Santa Maria della Gancia, Palazzo Abatellis) and 80 individuals from 6 cemeteries from the Norman and Swabian periods, 11-13th century (of which four cemeteries exhibit only the Muslim rite (Oratorio dei Bianchi, Monte Maranfusa, Monte Catalfaro and Villa del Tellaro) and three consist of cemeteries where the Muslim and Christian cemeteries are paired (Segesta, Monte Iato, and Palermo Corso del Mille). Burials in the Islamic rite are found in all the sampled cemeteries from the Islamic, Norman and Swabian periods, distributed widely in Sicily from Trapani to Noto. Each of these cemeteries will be studied with the aim of defining a well-dated window on the community concerned.

In addition to the contextual and archaeo-osteological data, the principal analyses to be undertaken are of stable isotopes of C, N, O and Sr, aDNA and radiocarbon dating. Ratios of isotopes of carbon and nitrogen C and N derived from the extraction of collagen from bones and teeth are informative about diet; they will be compared and contrasted with the information on comestibles from organic residue analysis (Lundy above) and the available cultivated plants and animals (Fiorentino and Aniceti, above) to produce an overall pattern of 'food cultures'. Isotopes of oxygen and strontium report on the mobility of individuals since their youth.

Overall, the stable isotope package offers a way of characterising the experience of people that can be justly called demographic. The most powerful tool for analysing the composition of an ancient population is currently aDNA which reports directly on the genetic character of individuals and in some cases can be used to write their genetic ancestry. The new methods of deep sequencing have come into the affordable range since our project began. The radiocarbon dating programme, which has yet to begin, has been designed both to anchor the buried communities in time and to date individuals of particular interest.

Stable Isotope Studies

Alice Ughi

Samples of stable isotopes of carbon and nitrogen have so far been extracted from 88 human individuals from nine Sicilian cemeteries. Of these, three were identified as featuring Islamic burial rites, four Christian and two with both rites (Segesta and Corso dei Mille, Palermo) (TABLE 3). The eventual total is expected to be in the order of 154 individuals from at least 16 cemeteries.

⁶⁰ On this topic see SAGUI 2007: 220-221 with bibliography.

⁶¹ MOLINARI 2016: 323; MOLINARI 2014: 332.

⁶² For example: the area of Bonagia Palace in the 12th would seem to be occupied by the gardens linked to the church of Santissima Trinità, also known as "Magione". PEZZINI 1998: 735-736.

Samples of 140 animals have been obtained from four Sicilian sites (Corso dei Mille (PA), Casale San Pietro at Castronovo (PA), Sant'Antonino (PA), and Mazara del Vallo (TP)), the families represented being Phasianidae, Ovis, Bovidae, Suidae, and Canidae. The results from animal remains have been used as a baseline for the interpretation of human isotope values and they also indicate differences in husbandry practices between different locations, and potentially changes through time. Together with values obtained from archaeological plants and fish remains they would represent the end points of the food sources available to the human individuals, the main object of this study.

Site	No. of Samples	Rate of Success	Yield	C:N	Faith	Period
Castello San Pietro (Palermo town)	4	100%	8.5%	3:2	I	9/10th c.
Corso dei Mille (Palermo town)	16	90%	6.4%	3:2	I/C	11/13th c.
Oratorio dei Bianchi (Palermo town)	3	100%	6.7%	3:2	I	12/13th c.
Contrada Sant'Agata (Palermo Pr.)	9	100%	7.9%	3:2	C	5/7th c.
Monte Maranfusa (Palermo Pr.)	5	100%	8.4%	3:2	I	10/13th c.
Quartiere Elenistico Romana (QER) (Agrigento Town)	15	100%	6.7%	3:2	C	5/7th c.
San Leone (Agrigento Pr.)	4	100%	6.1%	3:2	C	5/6th c.
San Miele (Trapani Pr.)	5	100%	5.1%	3:2	C	5/6th c.
Segesta (Trapani Pr.)	26	96.1%	6.7%	3:2	I/C	12/13th c.

TABLE 3 Samples analysed for Stable isotope analysis

Sufficient collagen has been extracted from 88 samples to be analysed for bulk stable isotope values for carbon and nitrogen. On archaeological grounds, the data have been assigned chronologically to three periods equating to Byzantine rule, Arab rule and Christian rule. However, it must be noted that the trends presented in what follows are still under scrutiny and more research needs to be done, including dating and further statistical and analytical work. Therefore the patterns and suggestions summarised here are strictly preliminary: their main use lies in signalling areas needing further investigation.

In comparing the data of individuals from the regions of Agrigento and Contrada Sant'Agata (Palermo) during the Byzantine period, some interesting differences have come to light: there was a notable enrichment in the $\delta^{13}\text{C}$ values of the bone collagen for some of the individuals recovered in Agrigento (QER) compared with those at Contrada Sant'Agata in Palermo province. The increase in these values may be due to the humans in Agrigento eating marine fish, but it can also be due to C_4 plant consumption, for example millet. But assigning the relative weight in the overall diet of these individuals to C_4 plant consumption, marine consumption, or a mixture of the two, using only bulk stable isotope analysis, will be challenging.

A recent diachronic study of a site in Greece showed a similar pattern in the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of individuals living under Byzantine rule, some individuals showing values suggesting an intake of marine resources, while others have values consistent with a fully terrestrial diet⁶³. This result is paralleled by studies on individuals found in 11th century Crete, where the fish component was quantified as 10-25% of the total diet⁶⁴. However other studies on 8 Greek Byzantine populations (6th-15th centuries AD), both inland and coastal, highlighted a land-based C_3 diet, with a main component of animal protein, with evidence of fish and possibly C_4 plants consumption only in some cases⁶⁵.

Migration may also be an issue here, which the analysis of oxygen and strontium isotopes may help to resolve. Studies of pilgrimage to Byzantine Palestine in monastic sites between the 5th and the 7th centuries for example, showed that 36 % of the 22 individuals studied exhibited $^{87}\text{Sr}/^{86}\text{Sr}$ values outside the local range, indicating a significant presence of non-locals⁶⁶.

In Palermo province during both Byzantine and Arab rule, there is a relative increase in $\delta^{15}\text{N}$. This is seen in other historic period populations including a recent study of an Islamic population from Southern Spain⁶⁷. There the analysis was carried out on stable isotopes of human and animal remains from a site in the Seville region with environmental conditions similar to Sicily (high temperatures and salinity) and in the same date

⁶³ BORSTAD C. *et al.*, 2018.

⁶⁴ BOURBOU, RICHARDS 2007.

⁶⁵ GARVIE-LOK, 2001; BOURBOU *et al.* 2011.

⁶⁶ SHERIDAN, GREGORICKA 2015.

⁶⁷ INSKIP *et al.* 2018.

range, the 9th -13th century AD. The results offer useful parallels. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values obtained suggested a diet mainly based on C₃ plants with a very limited shift to C₄ plant consumption, and no fish intake. These values were similar to those observed in samples from Castello San Pietro and Corso dei Mille. The interpretation of high $\delta^{15}\text{N}$, but relatively enriched $\delta^{13}\text{C}$ values may be the results of the environment (aridity) but it is often seen as a diet high in higher trophic level C₃-fed animal protein or alternatively macronutrient scrambling, where collagen incorporates carbon from C₃ energy sources over marine carbon whereas nitrogen derives from marine protein⁶⁸.

In the search for variations associated with religious practice, we have at least one site where individuals using the Islamic and Christian rites were buried in adjacent and nearly-contemporary cemeteries (at Segesta). To date no evidence has emerged that diet varied with religious affiliation and so far no clear evidence for the consumption of C₄ crops. This contrasts with a recent study from eastern Spain (Valencia), which found that there was a difference in diet between the two faith groups in the later medieval period (13-16th century): Muslims possessed higher $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values than Christians, probably due to the consumption of C₄ fed animals and/or low trophic level marine fish⁶⁹. This was considered to reflect socio-economic and status differences between the two populations. The numerous questions raised by these comparisons with preliminary results from Sicily will be addressed in the next stages of the research.

aDNA

Aurore Monnereau

The aDNA project focuses on how cultural and ideological transitions impacted on Sicily during the Middle Ages, as observable through ancient DNA analysis. The main aim of this part of the research is to analyse the genetic affiliations of human remains across the temporal and geographic range. During the Middle Ages, Sicily experienced major changes of regime from Byzantine to Aghlabid, Kalbid, Norman and Swabian. One of the main questions to be addressed is the impact of these changes on the genetic background of the medieval Sicilian population. If the regime changes brought new populations, a genetic discontinuity in the uniparental markers (mtDNA and/or Y chromosome) is to be expected. Moreover, analysis of nuclear genomic sequences from these past populations can reveal the identification of genetic affinities with modern populations, as well as a potential admixture between local medieval populations and incoming groups.

In the first period of research, the survival of aDNA in the archaeological specimens has been tested. 123 samples were provided from 14 cemeteries (five dated 5-8th century; three from 9-11th century, six from 11-13th century). The first step was to cut a portion of the bone of interest, which included teeth, long bones, but most commonly the petrous part of the temporal bone at the base of the skull. The petrous bone is targeted because recent studies show this tissue generally yields higher proportions of endogenous DNA⁷⁰. Several precautions have been followed in order to limit contamination. First the DNA extraction steps were conducted in a dedicated laboratory. Before digesting the tissue, the exterior surface was removed with a drill to reduce contaminant DNA from the depositional environment and the excavators. The extraction was performed using a modified silica-based protocol created to retain short fragments of DNA⁷¹. Lastly, DNA extracts were converted to *Illumina* libraries following the method developed by Meyer and Kircher (2010), the most commonly used approach in aDNA research. These sequencing results will be investigated to infer endogenous content of each specimen and then select those with sufficient human DNA to undergo further deep sequencing (Fig. 22).

⁶⁸ CRAIG *et al.* 2013.

⁶⁹ ALEXANDER *et al.* 2015.

⁷⁰ GAMBA *et al.* 2014.

⁷¹ DABNEY *et al.* 2013.

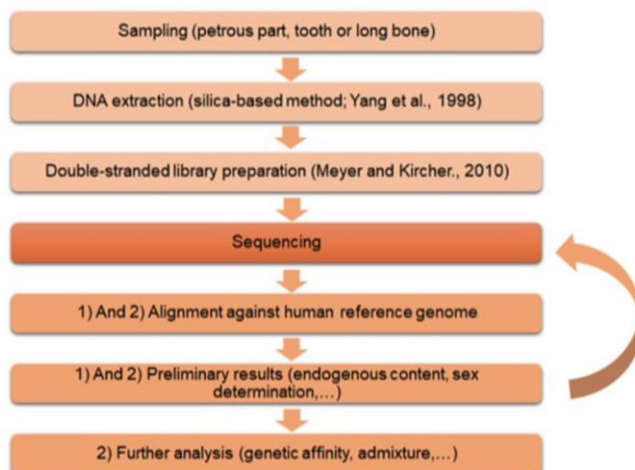


Fig. 22. The trajectory of aDNA analysis. Diagram showing the main steps. 1) refers to the preliminary analysis made feasible with the initial sequencing. 2) indicates the detailed genetic analyses accessible with relatively deep sequencing (Monnereau).

Seventy-five samples have been extracted so far with 57 undergoing the first sequencing step. These first data will allow analysis of the percentage of endogenous DNA as well as the genetic sex, and should permit rough estimates of genetic affinity with modern populations. The availability of these preliminary results will depend on the quality

and presence of endogenous DNA. Nevertheless, another sequencing run will be necessary in order to achieve detailed study of mitochondrial DNA (mtDNA) for the maternal history and high resolution genetic affinity with modern populations. Results from sequencing will begin to come available during 2019.

Conclusions: Preliminary interpretations and prospects

Martin Carver and Alessandra Molinari

Assessment of sites

Examination of the site of the ‘chiesetta’ on the eastern promontory of Monte Kassar (MK Int. 11) revealed a new aspect of the church – a late medieval phase. The final form of the building, stratigraphic logic and diagnostic finds determined that the building defined was essentially a 12th or 13th century church reusing in part some extant structure that was perhaps Byzantine in origin. Amongst the finds of the previous investigation was a late medieval pendant devoted to the Virgin Mary carrying quotations from both the Ave Maria and the Annunciation. This might be thought to imply an establishment served or used by women. These findings will need to be taken into account when a context is for this special place is finally determined⁷².

The excavations at Casale San Pietro (CLESP Int. 5) continue to provide the principal evidence for the sequence at early Medieval Castronovo and the 2017 season enlarged understanding of its nature. A Roman imperial phase, as yet undefined, constitutes the earliest occupation (2nd-3rd c.). The Late Roman/Byzantine period (5th-8th century) was well represented by the construction of a major building with mortared stone walls which survived to the 9th century and continued to provide the footprint for another three centuries of development. Amongst these, the period of Kalbid government based at Palermo (mid-10th to mid-11th century) stood out as the most archaeologically prominent and implies that Castronovo was making an active and important contribution to the economy at the time, presumably through agricultural production. The strong cultural signature of Islamic Palermo did not extend to an avoidance of pork. Veronica Aniceti found a distinction between rural producers (who ate pork) and urban consumers (who did not) in several of the sites she examined. This suggests that, as compared with the towns, the regime in the countryside was less rigorous or that Muslims were less in evidence. The presence of a hard surface frequented by horses in this period and the next revived the idea of the location as providing a way-station on the route from Palermo to Agrigento. At Casale San Pietro the Norman assemblage was impoverished in comparison to what had gone before. But important developments have been noted at San Vitale at this time, with the construction of a major church building and a newly

⁷² The words of Mary's response to the Angel Gabriel (Luke 1: 38) also occur in the Angelus, said everywhere at midday, so could apply to either sex. However it seems unlikely that a man would wear a pendant saying “*Ecce ancilla domini* (Behold the handmaid of the Lord)” and female devotion to the Virgin Mary is well documented, for example, in later medieval Books of Hours (SCOTT-STOKES 2012: 105).

identified castle keep. Current research on the Colle San Vitale and in the historic core of Castronovo is expected to illuminate still further the process by which central places and their mode of occupation by the aristocracy are transformed by successive regimes⁷³.

The site of the historic building at Casale San Pietro remains central to the story of Castronovo. Not only is it perched on a prominent rise in the plain, adjacent to both ancient road and river routes, but also it has evidence for having been a church, and before that a place of burial in the Islamic rite and before that a possible Byzantine necropolis as indicated by the two infant burials found in 2014 and implied by the rock cut tombs long known at Capillovenere⁷⁴. Furthermore the area being excavated near the Casale building in Int. 5 has continued to be the one place where a stratigraphic deposit of the 2nd-12th century has been conserved. The tasks that beckon are not only the completion and publication of the excavation, but an archaeological and architectural “*valorizzazione*” of the Casale building and its immediate surroundings, with a view to a long-term enhancement of the heritage.

Assessment of analyses

Analytical work undertaken in the laboratories of our partner universities on samples kindly provided by colleagues was first reported at the Plenary Seminar in July 2018 and has been briefly summarised here. In the case of the *Lecce laboratory*, environmental research is already well advanced, with the occurrence of a wide range of identified plants from early medieval Sicily. They are also making methodological advances of the greatest importance, identifying taxa of historical significance with greater certainty. One may single out the use of the anatomy of burnt wood to distinguish the different varieties of *prunus* fruit grown on cultivated trees and of morphometrics to classify seeds. Among the problems being addressed are two of the most fundamental: which plants were imported and exploited as cash crops in the 10th century – and what contribution they made to Fatimid prosperity and the development of Palermo as a trading place of international importance. A second task, no less important, is to establish the changing climate of the 5th to 13th century and whether its influence was determinant. The Lecce team has also addressed the question of new plants introduced during the Islamic regimes of the 9-11th century⁷⁵. Largely as a result of the exceptional series of stratified plant remains at Mazara del Vallo, they have turned around this debate (now nearly 50 years old) from a sceptical to a more positive direction.

The *medieval research group at Rome* is also advancing from a pre-existing research platform on ceramics, building technology and architectural history⁷⁶. We are developing a stronger ceramic typology and a network of supply for the 8th to 12th century that is being elaborated in ever increasing detail. Our ambitions for the history of the wider Mediterranean have been enhanced through the economic success of Sicily itself, notably in the 10th century and later, as a nodal point in reach of every part of the early medieval world.

The *laboratory at BioArCh* at York (combining biology, archaeology and chemistry) has a reputation for innovation, especially in proteomics and organic residue analysis, while maintaining strengths in biomolecular procedures applied to human, animal and plant remains. At York we chose to address the *Sictransit* agenda using young scientists (a PDRA and 3 PhD students) all of whom only began work in Oct 2017. Since their techniques are in continual development, this work is especially experimental, aiming to raise the identifications we make to higher levels of precision and significance. For these reasons, the emergence of valid results from Sicilian sites will take time, but the evaluation stages presented here are already promising.

This publication is the latest in a series of progress reports which we plan to issue annually in recognition of the collegiate collaboration of the senior scholars and excavators with whom we are privileged to make and share significant advances in the knowledge of early medieval Sicily.

⁷³ Molinari in CARVER AND MOLINARI 2018: 43.

⁷⁴ GIUSTOLISI 1999: 68.

⁷⁵ As proposed by WATSON 1983.

⁷⁶ Note the sister ERC project 695515 *Petrifying wealth* also based at the University of Rome Tor Vergata (director Sandro Carocci) and at the Agencia Estatal Consejo Superior de Investigaciones Científicas (Director Ana Rodríguez). https://cordis.europa.eu/project/rcn/204880_en.html.

Acknowledgements

The directors and staff of the sictransit project wish to signal their appreciation of the service to scholarship provided by FASTI FOLDER in enabling the presentation of a large and multi-faceted collaborative project in progress. We are greatly indebted to the researchers and excavators who have provided us with samples for scientific analysis, often in advance of their own publications. For sites referred to here, we thank in particular Lucia Arcifa (Castello San Pietro (PA), Rocchicella), Giuseppina Battaglia (Corso dei Mille (PA)), Monica Chiovaro (Palazzo Normanno (PA)), Alessandro Corretti (Entella), Francesco Fabbri (Segesta, Entella), Nicole Mölk (Monte Iato), Carla Aleo Nero (Sant'Antonino (PA)), Maria-Serena Rizzo (Agrigento, Colmitella), Francesca Spatafora and Viva Sacco (La Gancia (PA) and Palazzo Bonagia (PA). Particular thanks are owed to Agata Villa and Giuseppina Mammina who allowed us access to the archaeological store at Segesta; and we are all especially grateful to Stefano Vassallo of the Soprintendenza Archaeologica (Provincia di Palermo) who has encouraged, guided and facilitated our research in every possible way from its inception.

TABLE 4

List of Interventions at Castronovo di Sicilia

Monte Kassar (MK)

- Int 1: 2014 La Porta: resistivity survey in field to the SW of the gate (Goodchild)
- Int 2: 2014 La Chiesetta: magnetometer survey to N of church (Goodchild)
- Int 3: 2014 San Calogero, sorgente: magnetometer survey (Goodchild)
- Int 4: 2014 Casermetta: preliminary cleaning (Carver)
- Int 5: 2014 La Porta: test excavation to W of the gate enlarging the excavation of Vassallo in 2005 (Vassallo 2009, 2015) (Orecchioni)
- Int 6: 2014, 2015 Kassar Alta; test excavation enlarging saggi C-E of A. Villa excavated in 1984 (Villa 1997, Area A) (Carver, Giovannini, Orecchioni)
- Int 7: 2014 Opposite tower L: Magnetometry survey (Goodchild)
- Int 8: 2014 Survey of building fabric along the 1.9km length of the defensive wall (Giannini)
- Int 9: 2016 Area excavation of the extant foundations of the 'casermetta', including re-excavation of test pits by A. Villa made in 1984 (Villa 1997, Area B) (Orecchioni e Giovannini)
- Int 10: 2017 Test excavations on the site of geophysical anomalies detected in Int 7 (Giovannini)
- Int 11: 2017 Area excavation of the church of the eastern promontory ('chiesetta') (Orecchioni)

Casale San Pietro (CLESP)

- Int 1: 2014 Resistivity and magnetometry survey west of the Casale (Maestrangeli's field) (Goodchild)
- Int 2: 2014 Surface collection of pottery west of the Casale (Maestrangeli's field) (Hummler)
- Int 3: Metal detector survey [not actioned]
- Int 4: 2015 Test excavation west of the Casale (Maestrangeli's field) (children's tombs). (Hummler)
- Int 5: 2015, 2016, 2017 Area excavation north of the Casale (Roman to Norman sequence) (Meo e Hummler)
- Int 6: 2015 Test excavation south of the Casale (Fennel field N) (Byzantine wall foundation) (Hummler)
- Int 7: 2015 Recording of walls visible on the surface immediately south of the Casale (Hummler)
- Int 8: 2015 Test pit south of the Casale (Fennel field S) (Hummler)

Colle San Vitale (CSV)

- [Int 1] 2016, 2017 Survey of standing buildings on Colle di San Vitale (Giannini)
- [Int 2] 2016, 2017 Survey of Castronovo old town and hydraulic system (Giannini)
- [Int3] 2017 Excavation north of the church of the Guidice Giusto (Giannini e Canzioneri)

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